

The Examiner has cited 35 U.S.C. §102(b) in alleging that independent Claims 1, 10, 19 and 28 (“the independent claims”) are anticipated by Morzy. An “anticipation” rejection requires that the prior art reference disclose each and every element of the claim to which it is applied. *In re King*, 801 F.2d, 1324, 1326, 231 USPQ 136, 138, (Fed.Cir. 1986).

The independent claims have been amended to incorporate elements which are disclosed in the specification and drawings. Now, as presently written, these claims, and the claims dependent thereon are not anticipated by Morzy. The independent claims have been amended to incorporate elements which are disclosed in and supported by the specification and drawings.

Morzy discusses discovery of association rules from large data bases. The emphasis in the paper from Morzy’s perspective is association rules retrieval and item sets retrieval which they assert is recognized as the subset search problem in relational databases. Morzy acknowledges that subset search is not well supported by SQL query language and traditional database indexing techniques. Detailed explication of SQL query language and traditional database indexing techniques are the items that Morzy addresses in the reference. Morzy claims to introduce a new index structure, called Group Bitmap Index, and compare its performance with traditional indexing methods: B tree and bitmap indexes.

Applicants respectfully submit that in the rejection of the claims, the Examiner has made only general references to disclosures in Morzy that allegedly anticipate elements in Applicants’ claims. His reference to locations in Morzy do not clearly indicate with specificity, the support basis for the rejection(s). The sections in the Morzy disclosure that the Examiner has pointed to as anticipating the various claims are a general discussion of Morzy’s view of the prior art, i.e., SQL query language and traditional database indexing techniques. Morzy considers retrieval of association rules and item sets from a relational database.

Morzy acknowledges that where he states in column 2 of the article:

“We generalize both retrieval problems to the subset search problem and introduce a new index structure, called group bitmap index. We show the results of the experiment in which the group bitmap index significantly outperforms the traditional indexing methods; namely B+ tree and Bitmap indexes.”

The Morzy article comprising the *Introduction*, *Storage Structures*, *Queries*, *Group Bitmap Index*, *Simple Group Bitmap Index* sections does not disclose what Applicants are now claiming. The operating system that Morzy describes in the reference which the Examiner is citing as anticipatory is a subset search query. It is a set-oriented query that Morzy states is not well supported by SQL interface and traditional database accessing methods. Existing SQL language, which Morzy finds unsuitable, does not contain a subset search (or relational division) clause; therefore, to specify a subset search query in SQL, aggregation or multiple join clauses are required. Traditional accessing methods (B+ tree, bitmap index, etc.) are row-oriented, i.e., they reference single records.

Therefore, subset selection requires multiple use of the index. The subset search query that Morzy presents are two examples of an SQL queries retrieving from a database table *data_table* the identifiers of data item sets containing four given items 0, 7, 12, and 13, i.e.,

```

"1. select a.group_id          Table: data_table
   from data_table a, data_table b,
   data_table c, data_table d
   where a.group_id = b.group_id
   and b.group_id = c.group_id
   and c.group_id = d.group_id
   and a.item=0 and b.item=7
   and c.item = 12 and d.item = 13
   2. select group_id from data_table
      where item in (0,7, 12, 13)
      group by group_id
      having count(*) = 4

```

group_id	item
1	0
1	7
1	12
1	13
2	2
2	4
3	10
3	17
3	20 "

As noted above, Morzy finds this approach unsuitable since finding data item sets that contain a given subset is a complex and time-consuming task. Contrast the identifiers of data item sets with the limitations that Applicants have included in the independent claims to distinguish their invention over the Morzy reference.

The independent claims include elements which distinguish the invention over the Morzy reference by defining *inter alia*:

--population of the database with instances of independent relationships among said entities and concurrently populating said database with Bitsets, inserts, deletes and/or changes, there being constraints on the number of keys in the BitSet to allow database integrity thus disallowing incorrect relationship data from

being entered into said database, there being associations stored in the form of said Bitsets free from dependency on attribute data values;

submission of an explicit query for desired information so that said database performs evaluation of said query using said Bitsets, said Bitsets being of variable length and prepopulated based upon associations, said query processing being independent of data values, said query for desired information being queries for categorization involving retrieving entities associated with all levels, with a single query using column functions for relationships and Boolean Rule evaluation using a method selected from the group consisting of iteration of recursive queries, confirmation of existence of or count of entities in the relationship;

the use of computer readable program code to effect the use of fast User Defined Functions, said fast User Defined Functions being selected from the group consisting of scalar functions and column functions, said scalar functions selected from the group consisting of BSGetLength(BITSET), BSInitO, BSInit(BIGINT,BIGINT), BSSetBit(BitSet, BIGINT), BSClearBit(BitSet, BIGINT), BSGetBit(BIGINT), BSAnd(BitSet, BitSet), BSOr(BitSet, BitSet), BSEquals(BitSet, BitSet), BSMinus(BitSet, BitSet), BSAndEquals(BitSet, BitSet), BSAndIsEmpty(BitSet, BitSet), BSGetBitAt(BitSet, BIGINT), BSGetUpperBound(BitSet), BSGetLowerBound(BitSet). --

Newly added Claims 37 and 38 contain even more limitations that distinguish over Morzy.

Morzy, directly or indirectly, does not disclose these elements found in Applicants' independent claims. In fact Morzy specifically disclaims the system that he has described in the *Introduction, Storage Structures, Queries, Group Bitmap Index, Simple Group Bitmap Index* sections noted above where he states at Column 5:

"Let us notice that the simple group bitmap keys have to be N-bit long, where N denotes the number of all possible items. In practice, N can be of order of hundreds or thousands. It results in very long, space-consuming simple group bitmap keys that are difficult to store as well as to process. Moreover, since the database is dynamic in nature that means that the number of possible items may change in time, then the length of simple group bitmap keys should change respectively. The maintenance of such index would be costly and difficult. Therefore, the simple group bitmap index has rather theoretical character. However, in case of a static database with a small number of possible items it could be applicable."

The key to Morzy's improvement is in the "Hash Group Index" as described starting at Column 6 of the article. The "Hash Group Index" is a subset search with hash group bitmap index. The application is performed using a two step procedure consisting of a filtering step and a verification step. The portion of the reference relating to the Hash Group Index contains no disclosure which is anticipatory of the claims of the present invention.

There must be no differences between the subject matter of the claim and the disclosure of the prior art reference. This is not the case with the instant claims and the Morzy reference. The reference must contain within its four corners adequate direction to practice the invention as claimed. The corollary is also equally applicable in that absence from the applied reference of any claimed element negates anticipation. *Kloster Speedsteel AB v. Crucible Inc.*, 793 F.2d, 1565, 1571, 230 USPQ 81, 84, (Fed.Cir. 1986).

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

"The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

"The elements must be arranged as required by the claim..." *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir.).

These excerpts from controlling patent law cases have not been followed in the instant application.

Claims 4 and 5 and the other claims in the application that track the language of those two claims have been amended to substitute "when" for "if" to eliminate any objection that the limitation is conditional. The word "if" denotes possibility or condition whereas "when" indicates a time certain that something will occur.

If there are any additional charges incurred as a result of this amendment, the Commissioner is authorized to charge such amount to deposit account 50-0510.

In view of the arguments and modifications to the claims, allowance of this case is warranted. Such favorable action is respectfully solicited. If the Examiner wishes to discuss via telephone the substance of any of the proposed claim changes contained herein with the intent of putting them into an allowable form, Applicants' attorney will be glad to speak with him at a mutually agreeable time and will cooperate in any way possible

Respectfully submitted,



Thomas A. Beck
Reg. No. 20,816
6136 West Kimberly Way
Glendale, AZ 85308-7627

I certify that this amendment was deposited with the United States Postal Service on the date shown below addressed to: *Assistant Commissioner of Patents, P.O. Box 1450. Alexandria, VA 22313-1450*

Signature



Name: Thomas A. Beck

Date: January 20, 2011